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INFLUENCE OF RISK MANAGEMENT STRATEGIES ON ROAD CONSTRUCTION PERFORMANCE OF MUHANGA – NGORORERO ROAD CONSTRUCTION PROJECT IN RWANDA

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Postgraduate Studies in Partial Fulfillment of the Requirements for the Award of Master of in Project Management of the University of Kigali

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ABSTRACT

The purpose of the study is to analyze the Influence of risk management strategies on road construction performance the case of Muhanga-Ngororero road construction project, in Rwanda; the research objectives include to determine the influence of risk avoidance strategy, to establish the influence of risk reduction strategy, to observe the influence of risk transfer strategy and to assess the influences of risk retention strategy and performance of road construction projects .The target population of the study was key persons involved in selected road construction project undertaken in Horizon construction Ltd. As the study population comprises a few number of people 166, a researcher used census inquiry. The study used descriptive and correlation research design. The study used also primary data which were gathered by administering questionnaires, interview, and observation. Then the data were presented and analyzed using descriptive and inferential statistics. Descriptive statistical involved the use of frequencies tables' standard deviation, mean and mode while inferential statistics include the use of correlation and regression analysis to analyze quantitative data. The outcomes of the research were presented in form of tables, frequencies, percentages to ease interpretations and understanding. Analysis of

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the data was performed by using SPSS software where regression analysis was performed to determine the relationship between independent and dependent variable. The findings revealed that the overall view of respondents on road construction project performance was very high mean equal to 4.37 which implies that there is strong evidence fact that road project performance was at very high extent and standard deviation of 1.04 which implies that heterogeneity responses which demonstrated that the observations were largely close to the mean affirming there is existing fact that road construction project was effective. The researcher recommends that on project risk response planning, the study recommends involvement of all stakeholders with interest in road construction project and adoption of a wide range of responses to risks with emphasis on risk prevention. Finally, on project risk monitoring and control, the study recommends that risk be monitored and controlled more frequently to ensure success road construction project.

1. INTRODUCTION

The construction industry plays a big role to the GDP and employment rate of many countries and particularly economically developing countries. The construction industry plays a big role to the GDP and employment rate of many countries and for this reason, it is considered vigorous for the economic development of any nation (Olwale & Sung, 2018). The big role the construction industry plays in socio-economic development has the important effects (Morris & Hough, 1988). The infrastructure provided by constructing the physical facilities required for the production and distribution of goods and services.

Construction projects have five major stages namely planning, programming and design, procurement, implementation and project closing. Every stage has its own risks. The risks at planning stage are poor scope definition, poor estimates and budget. The programming and design may have risks like over-designing, poor constructability, poor estimating and scope creep. The procurement stage is often disturbed by risks of incomplete documents, poor contracting strategy, insufficient competition and fraud in the bidding process.(Gitau, 2015) The construction phase is met with risks of change orders, delays and quality concerns. The risks at the closing phase of the project include snag/punch lists issues, insufficient time for testing and commissioning and claims (Sebatigita, 2019).

In Africa, failure of construction projects generates a cycle of rising expectations and unfulfilled promises. Most of the construction projects in Nigerian construction sector are faced with the problem of project delay. In their study, Ogunsemi and Jagboro (2006) found that construction projects in Nigeria are facing a serious challenge of cost overrun. In their study, Aibinu and Odenyinka (2006) assessed causes delay in construction projects in Nigeria. They evaluated nine

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factors which include; contractor, service engineer, architect, client, supplier, quantity surveyor, external factors, sub-contractor and structural engineer. The findings of their study identified ten overall delay factors which include; contractors financial difficulty, incomplete drawing by the architect, slow mobilization by the contractor, inadequate fund by a client, late delivery of materials by suppliers, problems of planning, scheduling by the contractor, breakdown of the machines and late delivery by suppliers. The authors concluded that poor risk management strategies lead to project delay, which results in a poor performance of construction projects.

Risk and uncertainty can potentially have damaging consequences for the construction projects (Chileshe, 2007). Therefore, risk analysis and management continue to be a major feature of the project management of construction projects in an attempt to deal effectively with uncertainty and unexpected events and to achieve project success. Project Management Institute defines project risk as an uncertain event or condition and that the occurrence has positive or negative effect on at least one project objective, such as time, cost, scope, or quality (PMI, 2008).
Risk is defined as exposure to loss/gain or the probability of occurrence of loss/gain multiplied by its respective magnitude. Events are said to be certain if the probability of their occurrence is 100% or totally uncertain if the probability of occurrence is 0%. In between these extremes, the uncertainty varies rather widely. Nowadays, risk can be assessed using various types of information(Zavadskas et Al.2010).

According to OECD (2016), there are several types of the risk strategies, which can be used, depending on the level of risk; transfer, retention, reduction, and avoidance of risk. Avoiding risk entails not involving yourself with activities that could carry risk. This can be seen as the solution to all risk but on the other hand, it can also translate to losing an opportunity that accepting the risk may have allowed. Risk avoidance is the most effective according to Dorfman (2007). Risk reduction involves reducing the likelihood of a loss occurring. Risk transferring involves transferring involves transferring the responsibility to another party by contracting, insurance, legislation or other means. Risk retention can be defined as accepting the benefit of gain or loss when the risk occurs. This strategy can be used when the cost of insuring risk is greater over time than total losses incurred.

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The establishment of relationship between risk management strategies and the duration of projects is what is lacking in most project risk management literature and this therefore had motivated the study which focused particularly on road construction performed by Horizon construction Ltd in Rwanda.

2. STATEMENT OF THE PROBLEM

Project risk management offers a great opportunity to improve project performance dramatically. Sebatigita (2019) noted that cost increase and lack of schedule adherence in large infrastructure projects have been widely recognized as risks affecting project performance. Sundararajan (2014) stated that if risk events are not well managed, increasing costs, capital structure changes, operations delays, budget overruns, loss of cash inflow, liquidated damage claims, low quality products, repetition of project work after completion may be a common activity. Numerous studies on influences of risk management strategies on the performance of projects have been conducted in other sectors but none of the above studies focused on the Muhanga-Ngororero construction road project. Most projects in Rwanda face various challenges including delays in completion, upward revaluation of project costs, poor quality workmanships and premature termination of the projects. The numerous incidents of reported delays and increase in project costs for major public sector projects in Rwanda is a major concern to researchers, clients, project sponsors, contractors and other stakeholders and cast a major doubt whether the government is able to guarantee value for money to the taxpayers (Kanamugire, 2016).

This phenomenon is also reproduced in Horizon Construction Ltd where major projects have not been completed on time, budget/cost and met quality and design specifications. Especially for the Muhanga – Ngororero road construction project where there was extensions of time, variation of prices and/or variation orders in order to complete the projects and cater for costs attributed to the change in scope. It is in this perspective this research examines influences of risk management strategies on project performance the case of Muhanga-Ngororero construction road project in Rwanda.

3 .OBJECTIVES OF THE STUDY

i. To determine the influence of risk avoidance strategy on road construction project performance in Rwanda;

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ii. To establish the influence of risk reduction strategy/Mitigation on road construction project performance in Rwanda;

iii. To examine the influence of risk transfer strategy on road construction project performance;

iv. To assess the influence of risk retention strategy/Acceptance on road construction project performance in Rwanda.

4. LITERATURE REVIEW

This chapter discusses literature which is associated with the study. The chapter reveals theoretical and conceptual framework

4.1. Theoretical Review

The study was guided by the following theories: Stakeholder Theory and Risk Management Theory.

The Stakeholder Theory

The stakeholder theory is a management theory that the purpose of any given entity is to create value for the stakeholders as initially proposed by Freeman (1994). This theory also envisages the equal sharing of costs while having the agency principle in transparency such that all players in the entity know and respect their position. Similarly, the theory aims to ensure that an entity should be lasting long enough to benefit stakeholders while having corrections in all projects as this enables auditing to be carried out while avoiding risky takes that chance-taking agents could carry out(Joyce, 2021).

Stakeholder theory result out that mainly an entity is viable only if it produces value to the stakeholders. In other words, stakeholders do not need remaining as stakeholders if their entity does not add value to them as stakeholders. This implies that both the entity and the beneficiaries must have an interest in each other, or else there would occur opportunism in the running of the entity as well in the participation by stakeholders (Joyce, 2021).

The stakeholder theory has been critiqued as having no basis to involve the stakeholders since stakeholders have no obligation to participate in the entity's activities. Similarly, an entity can move away without necessarily being held accountable by the interested parties if there is a clear case of collapsed operations through lack of funding or force majeure, which refers to

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unavoidable circumstances like war, conflict and severe natural calamities (Jones et al., 2017). Another criticism of the stakeholder theory is that it tends to weaken the entity management team's responsibility by appearing to create another silent force of power in the stakeholders. This means the top management could plan with stakeholders to undermine the entity project for selfish means (Freeman, Phillips & Sisodia, 2020). The theory supports risk sharing strategy of the study since in a project, there is need to have stakeholders input in order to ascertain the usability or beneficial outputs from the project. Similarly, the principles of the theory that calls for interest of all stakeholders means that the stakeholders could have a say in designing the risk reduction as well as risk avoidance since they are far more capable of understanding the positive and negative effects with the avoidance, reduction and sharing strategies. It is important that stakeholders are well informed of such strategies in order to avoid audit queries in case of a project not performing to its maximum potential thus avoiding losses.

Risk Management Theory

Risk management model is the theory that this study is anchored on. According to Kerzner (2013), risk management in projects includes outlining how hazards will be managed in the particular project, assigning a risk officer who is a team member to be responsible for foreseeing potential project hazard, maintaining project hazard database, creating anonymous risk reporting channel, prepare response plans for risks that are chosen to be mitigated and summarizing planned and faced risks, effectiveness of mitigation activities, and effort spent for the risk management. In literature there are varieties of risk management models. The international standard “Project Risk Management – Application Guidelines” (IEC, 2001) offers a model with four steps: identification of risk, assessment of risk, treatment of risk, and risk review and observing. Baloi and Price (2003) include an additional step of risk communication.

Chapman and Ward (2003) suggest a framework called Shape, Harness, and Manage Project Uncertainty (SHAMPU) which Consists of nine stages: describe the scheme, centre the scheme, detect the concerns, organize the disputes, explain possession, approximate inconsistency, assess consequence, bind the policies, and control enactment. PMI (2013) have divided risk management into six processes: planning on how to manage the risk, identifying the risk, analysingthe risk qualitatively, analysing the risk quantitatively, responding to the

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risk and controlling the risk. Risk identification, assessment and response form the core of project risk management (PMI, 2013).

Risk identification involves identifying those risks likely to affect the projects and documenting their characteristics. This process should involve many project stakeholders as possible. Various projects risks can be identified though brainstorming, expert opinion, structured interviews, questionnaires, checklists, historical data, previous experience, testing, modelling, and evaluation of other projects (Chapman and Ward, 2003). When carrying out risk assessment, identified risks are evaluated and ranked (Chapman and Ward, 2003). The vision is to minimize hazards and maximize opportunities centered on the principles of hazard management theory, it evident that hazard identification is fundamental in the realization of successful projects at the construction projects (Kerzner, 2013).

It entails recognizing the potential risks that may affect performance of construction activities through such means as collection of primary data from relevant stakeholders like contractors and construction experts (Kerzner, 2013). Gathering data from stakeholders provides project managers with adequate information on the potential inner and outer risks that are likely to distress the realization of maximum production from construction projects (Chapman and Ward, 2003). Upon identification of risks that are likely to derail the realization of successful construction projects, it is important to assess the magnitude of the risks and curb those that are likely to cause huge and negative financial implications

4.2. Conceptual framework

A conceptual framework is a hypothesized model identifying the concepts under study and their relationships (Mugenda & Mugenda 2003). It presents in a diagrammatic form the way the researcher has conceptualized the relationship between the independent and the dependent as well as the confounding variables. The independent variable is women entrepreneurship empowerment grouped together on the left side but not in any order of importance. The dependent variable which is dependent women border traders is placed on the right hand connected with an arrow as a sign of direct relationship.

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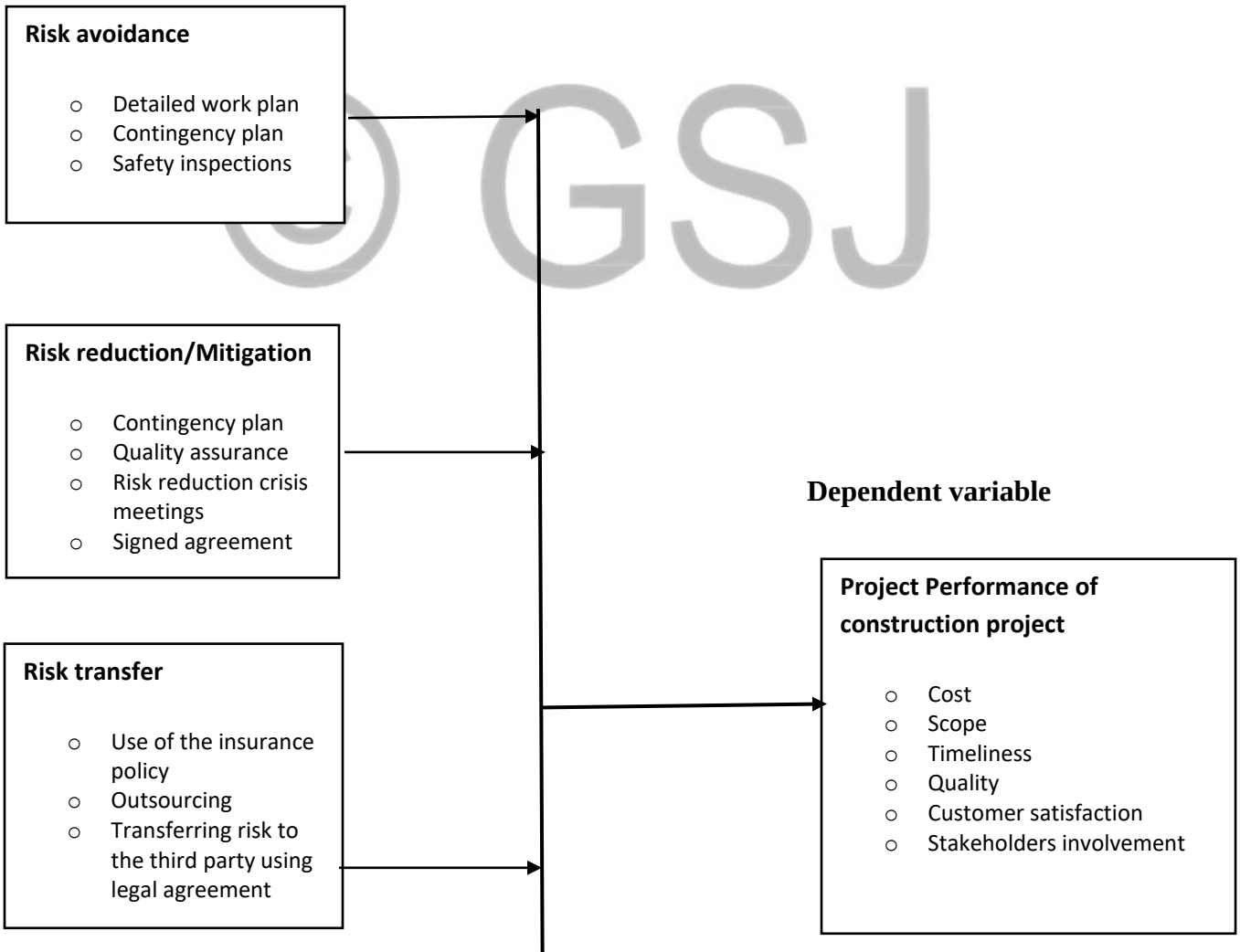
Independent Variables (IV)
Risk management strategies



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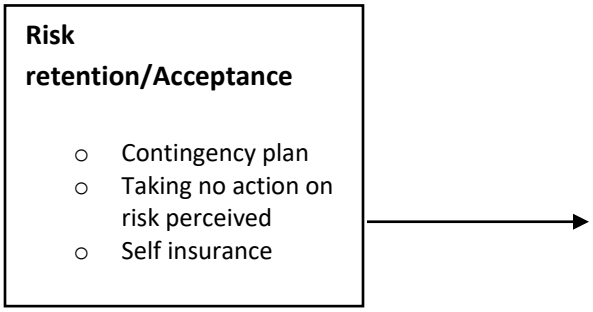

Source : Researcher's compilation, 2022

Figure 1: Conceptual Framework

5. MATERIALS AND METHODOLOGY

5.1. Research Design

This study used the descriptive and correlational research design. Descriptive research, according to Saunders et al (2007), uses quantitative methods to describe what is, describing, and recording, analyzing and interpreting conditions that exist. It involves some type of comparison or contrast and attempts to discover relationships between existing non-manipulated variables. Descriptive correlational design is used in research studies that aim to provide static pictures of situations as well as establish the relationship between different variables (Creswell, 2013). In correlational research, two variables such as dependent and independent are studied to establish their relationship. It is research designed to discover relationships among variables and to allow the prediction of future events from present knowledge. The researcher used surveys, observation and secondary data for data collection method. The study conducted as a quantitative research designs- correlational research. In this type of design, relationships between and among a number of facts are sought and interpreted. This type of research recognized trends and patterns in data, but it does not go so far in its analysis to prove causes for these observed patterns. The data, relationships, and distributions of variables were studied only.

In correlational research, the aim of the researcher is to determine the relationship between one thing (an independent variable) and another (a dependent variable) in a population. Researchers use correlations to see if a relationship between two or more variables exists, but the variables themselves are not under the control of the researchers (Creswell, 2014).Proposed

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research intends to analyze the relationship between risk management strategies as independent variables and construction projects performance as dependent variables. Researcher determined the extent of a relationship between the stated variables.

5.2. Population of the study and sample size

The target population is the entire population, or group, that a researcher is interested in researching and analyzing. The target population is the total group of individuals from which the sample might be drawn. A sample is the group of people who take part in the investigation. The people who take part are referred to as "participants" (McLeod, 2019). The target population is the total group of individuals from which the sample might be drawn. The choice was made based on where the researcher found it easy to get respondents and where target population can be found. The population size for this study covered 166 people including: implementers contractors, consultant firms, Governmental officials and stakeholders. The researcher used census sampling technique to select 166 project implementers contractors, consultant firms, Governmental officials and stakeholders.

5.3. Data collection instruments

The researcher therefore compounds the use of questionnaire in the process of collecting primary data.

Questionnaire

A questionnaire is a research instrument consisting of a series of questions and other prompts for gathering information from respondents. Kothari (2011) said that a questionnaire is justifiable in data collection mainly because; it enables the researcher to collect large amount of data within a short time period, it also provides opportunity for respondents to give frank, anonymous answers.

Structured questionnaires were used to collect data for this study. Questionnaires were the most appropriate instrument as they provide a high degree of data standardization and generalization. Moreover, they are easy to administer and collect. According to Mugenda (2003) questionnaire are simple to administer, scoring of items and to analyze. The questionnaires contained open and closed questions to give respondents easy time to provide answers. The aim of the questions is to obtain data on the impact of risk management strategies on the performance of road construction projects in Horizon construction Ltd in Rwanda.

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The structured questionnaires were used by the researcher as an instrument for the collection of data and were divided into three sections. The ft section covered the demographic-data of the respondents and required them to provide data on the type of respondent they are; project managers, engineers, quantity surveyors and construction specialists. It required the respondents age, sex and department and their length of service with their organization. The second section will address the research objectives which are to investigate the risk management strategies on performance of road construction projects in Horizon construction Ltd. The questionnaire used scale because it requires respondents to respond to a series of statements by indicating whether he or she strongly agree, agree, disagree and strongly disagree.

5.4. Reliability and validity of the measurement instruments

Before data collection it is important to test for reliability and validity of research instruments as shown in the section below.

Validity

Validity refers to the degree to which an instrument accurately measures what it intends to measure. Three common types of validity for researchers and evaluators to consider are content, construct, and criterion validities. Evaluating the validity of a qualitative study is essential for using the research findings in practices. Research validity is the term used for evaluating the quality of a qualitative study (Sekaran, 2006).

Content validity sought, Content Valid Index (CVI) is a scale developed by computing or ranking the relevant items in the instrument or questionnaire by checking their clarity, their meaningfulness in line with all objectives stated dividing by the total number of items (Neville, 2007). Content Validity is the degree to which an instrument has an appropriate sample of items for the construct being measured and is an important procedure in scale development. CVI is the most widely used index in the quantitative evaluation. According to Amin (2005), the CVI of above 0.6 is appropriate validity The validity was tested using Content Validity Index (CVI).

$$\text{CVI} = \frac{\text{No. of items regarded relevant by judges}}{\text{Total No. of items}}$$

For this study the calculated CVI was

CVI= 26/30=0.866

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If the calculated CVI is greater than 0.60 (Newing, 2018) the questionnaire was considered valid. Hence, this study is greater than 0.60, the questionnaire is valid.

Reliability of the measurement instrument

According to Creswell (2013), the real meaning of a research is to use the trusted instrument prior to any kick off research. The researcher has to confirm validity of instrument and make a pre-test to determine its reliability. Reliability refers to consistency with which repeated measures produce the same results across time and across observers (Patton, 2002).

In order to ensure reliability of the data in this study, two methods of data collection were used. There were questionnaire and documentary in the reports of Horizon construction Ltd related to risk management strategies and performance of construction projects. Questionnaire was developed in respect of the objectives of the research questions. According to Sekaran (2020) Alpha values for each variable under study should not be less than 0.7 for the statements in the instruments to be deemed reliable. The reliability ensure by testing the instruments for the reliability of values (Alpha values) by calculating Cronbatch alpha values.

Table 3.1: Reliability Statistics

Cronbach's Alpha	N of Items
0.789	30

Source: Primary data, 2022

The findings indicated that al variables had a coefficient of 0.789. All constructs depicted that the value of Cronbach's Alpha are above the suggested value of 0.7 thus the study was reliable.

5.5. Data analysis

In the journey of analyzing data, researcher concentrated on analysis and presentation of data. For data analysis, researcher used Statistical Programs for Social Sciences (SPSS) 18version. Quantitative information was analyzed using both descriptive and inferential statistics. Descriptive statistics was essential to find the frequencies, percentages, mean and Standard deviation of the collected information. On the other hand, the researcher also conducted multiple regression to recognize the nature and strength of relationship between the dependent variable and the independent variables. The Multiple regression model of the study is presented below.

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$Y = \beta O + \beta 1X1 + \beta 2X2 + \beta 3X3 + \beta 4X4 + \epsilon$

Where; Y = Dependent Variable

$\beta 0$ = a constant coefficient (if any)

$\beta 1$ to $\beta 4$ = are coefficients for each variable

X1 = Risk Avoidance

X2 = Risk Retention

X3 = Risk Reduction

X4 = Risk Transfer

6. FINDINGS

6.1 Correlation analysis

Analysis of the correlation is generally performed to determine the relation between the variables. The primary objective of conducting correlation analysis in this research work is to establish the relationship between project risk management strategies and road construction performance. The Spearman's coefficient of correlation ranges between +1 to -1. A zero (0) coefficient indicates that there is no association between the two variables. A coefficient value of greater than 0 indicates a positive relationship between the variables and hence an increase in the value of one variable leads to an increase in the other values of the other variable and the converse is true. The study sought to determine the correlation between the independent variables (Risk avoidance, Risk retention, Risk reduction and Risk transfer) and the dependent variable (performance of road project). To calculate the correlation (strength) between the study variables and their findings the survey data used the Spearman's coefficient of correlation (r). The findings were presented in table 4.7

Table 1: Correlation analysis

	X_1	X_2	X_3	X_4	Y

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Spearman's rho	Risk avoidance	Correlation Coefficient	1				
	Risk retention	Correlation Coefficient	.313**	1			
	Risk reduction	Correlation Coefficient	.060	.177	1		
	Risk transfer	Correlation Coefficient	.029	.150	.029	1	
	Performance of Road Construction project	Correlation Coefficient	.552**	.375**	.797**	.681**	1
		Sig. (2-tailed)	.002	.000	.003	.001	.

**. Correlation is significant at the 0.01 level (2-tailed).

The correlation values for all independent variables indicated a strong positive correlation relative to the dependent variable. There existed a significant moderate positive correlation (R = 0.552**,p-value=0.002<0.01) between risk avoidance and the performance of road construction project. There existed a significant weak positive correlation (R = 0.375**,p-value=0.000<0.01) between risk retention and the performance of road construction project. There existed significant high positive correlation (R = 0. 797**,p-value=0.003<0.01) between risk reduction and the performance of road Construction project. Finally, the study established the existed of a strong positive correlation (R = 0.681**,p-value=0.001<0.01) between project risk transfer and the performance of road Construction Project.

6.2. Multiple linear regression

The study sought determines the influence of project risk management strategies on road project performance. The study sought to establish the extent to which study variables such as risk avoidance, risk retention, risk reduction and risk transfer. A basic linear model of regression is run to investigate the relation between independent & dependent variable. Regression analysis shows the dependent variable uniqueness which varies with any of change in independent variable. We check that to what extent a variable is bringing unit change in another variable or whether this change is positive or negative. Therefore, table below describes the relation between independent and dependent variable through a simple regression change that how much change it is bringing and what is the nature of the impact.

Table 2: Model Summary

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Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.868[a]	.753	.740	0.00201

a. Predictors: (Constant), Risk avoidance, Risk retention, Risk reduction and Risk transfer

The table 2 shows the coefficient of determination or adjusted R square stands at 0.740. This essentially meant that 74% of the variation in the road project performance (the dependent variable) was explained by variability in the independent variables i.e. risk avoidance, risk retention, risk reduction and risk transfer. As such, only 26% of the variation in the performance of road construction project was explained by other factors not included in the model. This is consistent with Pallant (2001) who found that the appropriate threshold for R Square is 0.7

Table 3: ANOVA

Model		**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
1	Regression	7458.040	4	1864.510	122.66	.000[a]
	Residual	2447.839	161	15.2		
	Total	9905.880	165			

a. Predictors: (Constant), Risk avoidance, Risk retention, Risk reduction and Risk transfer

b. Dependent Variable: Road construction project performance

Table 3 gives an F-test to determine whether the model had a good fit for the data. The F Statistics of 122.66 (P value=0.000< 0.05) indicated that the model formed between risk management strategies and road construction project performance was significant. It also showed

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that the independent variables are good predictors of road construction project performance. This is a clear indication that the data used in the study was adequate and reliable for making conclusion of the variables under study since the value of significance (p-value) is lower than 5%. The calculated F= 122.66 exceeds the F critical of 2.42, the study concludes that since F calculated in the study is greater than the F critical (value = 2.42), then the overall model is significant and that risk avoidance, risk retention, risk reduction and risk transfer influence road construction project performance.

Table 4 : Regression coefficients

	Unstandardized Coefficients		Standardized Coefficients		
Model	B	Std. Error	Beta	t	Sig.
1 (Constant)	4.646	5.826		2.484	.002
Risk avoidance (X_1)	.199	.159	.090	3.257	.000
Risk retention (X_2)	1.226	.139	.851	8.797	.000
Risk reduction (X_3)	.396	.123	.162	3.781	.000
Risk transfer (X_4)	.341	.163	.155	2.085	.040

a. Dependent Variable: Road Construction Project performance

Source: Primary data, 2022

The equation ($Y = \beta 0+\beta_1 x_1+\beta_2 x_2+\beta_3 x_3++\beta_4 x_4+ \varepsilon$) becomes:

Road Construction Project performance = $4.646+ 0.199X_1+ 1.226X_2+ 0.396X_3 + 0.341X_4$

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The regression equation above has established that taking all factors into account (risk avoidance, risk retention, risk reduction and risk transfer) constant at zero; road construction project performance will be 4.646

The regression results revealed that risk avoidance has significance positive effect on Road construction Project performance as indicated by $\beta 1 = 0.199$, $p=0.000<0.05$, $t= 3.257$. The implication is that an increase of one unit in risk avoidance would lead to an increase in Road construction project performance by 0.199 units.

The regression results revealed that risk retention has significance positive effect on Road construction project performance as indicated by $\beta_2=1.226$, $p=0.000<0.05$, $t=8.797$. The implication is that an increase of one unit in risk retention would lead to an increase in Road construction project performance by 1.226 units.

The regression results revealed that risk reduction has significance positive effect on Road construction project performance as indicated by $\beta_3= 0.396$, $p=0.000<0.05$, $t= 3.781$. The implication there is sufficient evidence that an increase of unit in risk reduction would lead to an increase in Road Construction Project performance by 0.396 units.

The regression results revealed that risk transfer have significance positive effect on Road construction project performance as indicated by $\beta_4= 0.341$, $p=0.040<0.05$, $t= 2.085$. The implication there is sufficient evidence that an increase of unit in risk transfer would lead to an increase in road construction project performance by 0.341 units.

7. CONCLUSION AND RECOMMENDATIONS

7.1. Conclusion

Based on the findings, risk management is a concept that is becoming very popular in many companies. Many construction companies often implement risk management in their projects to increase productivity and increase profits as well improve the overall performance. The hypothesis between risk management and project performance has examined in construction industry in Rwanda. The result revealed that practicing risk management improve the performance of construction project significantly. Although this research has answered the main research questions and successfully tested the relationship between project risk management has

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a significant effect on project performance in construction industry. The overall view of respondents on road construction project performance was very high mean equal to 4.37 which implies that there is strong evidence fact that road project performance was at very high extent and standard deviation of 1.04 which implies that heterogeneity responses which demonstrated that the observations were largely close to the mean affirming there is existing fact that road construction project was effective. Acceptance indicates a decision not to make any changes to the project plan to deal with a risk or that a suitable response strategy cannot be identified. From the study findings it was apparent that there existed statistically significant relationship between risk acceptance and performance of projects, this was clearly indicated in by utilization of various techniques in the effort to avoid risks including use of contingency plans, implementation of safety systems, use of work plans in execution of projects and utilization of regular inspections to ensure no eventuality occurs that may affect the performance of project.

7.2. Recommendations

Based on the research results, the following recommendations can be offered:

The study recommended training of staff at all levels on different aspects of project risk management to further improve the implementation framework in order to ensure time (schedule), scope (quality) and cost (budget) compliance of road construction project

On project risk identification, the study recommends more stakeholder engagement in project risk management to ensure more productive identification of project risks.

Regarding project risk analysis, the study established that the analysis tools utilised were only moderately effective and viable in risk analysis. As such, the project management team should explore ways for enhancing the effectiveness of the tools in risk analysis by providing more orientation of stakeholders on this.

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On project risk response planning, the study recommends involvement of all stakeholders with interest in road construction project and adoption of a wide range of responses to risks with emphasis on risk prevention. Finally, on project risk monitoring and control, the study recommends that risk be monitored and controlled more frequently to ensure success road construction project.

The management of road construction project should keep up the project risk analysis protocols that are in place and try to improve by providing an effective linkage between the project risk identification process and the analysis since the latter is a natural progression from the former. It should also consider the use of more quantitative risk analysis tools such as critical path scheduling or cost estimating to boost the project risk analysis effort even further. .

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